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SPECIFICATION

**INVENTION: GAS GENERATING CELL OR BATTERY AND
METHOD OF PRODUCING SAME**

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U.S. PATENT AND TRADEMARK OFFICE

GAS GENERATING CELL OR BATTERY AND METHOD OF PRODUCING SAME

[0001] The invention relates to a gas generating cell or to a battery consisting of several such cells according to the preamble of Claim 1 and to a method according to the preamble of Claim 7.

[0002] A hydrogen generating cell of the above-mentioned type is known from German Patent Document DE 35 32 335 C2. This hydrogen generating cell has a zinc anode, a hydrogen cathode and an alkaline electrolyte, in which case the cathode consists of a PTFE-bound metal and/or carbon powder layer which is placed into a metallic network as a current conductor and, on the side preferably facing away from the network, contains a porous PTFE foil which is laminated on, for example, rolled on. This cell can be implemented, for example, by using a zinc/air cell of a commercially available construction, in which case, while air and oxygen are excluded, by closing an exterior circuit, a current flow, which generates hydrogen inside the cell, is generated. The hydrogen leaves the cell by an opening in the housing.

[0003] This construction has been successful, which creates the need of being able to implement in a simple manner also cells which have a higher capacity than the commercially available zinc/air cells.

[0004] It is an object of the invention to solve this problem.

[0005] The invention solves this problem by means of the object of Claim 1.

[0006] The invention also solves this problem by means of the method indicated in Claim 7.

[0007] The use of an inverse construction eliminates the restrictions existing so far in this respect.

[0008] Accordingly, at least the cathode and the separator are accommodated in the cover, and, together with these elements and the sealing ring, the cover forms a preassembled unit for an insertion into the anode cup.

[0009] Additional advantageous further developments of the invention are contained in the remaining subclaims.

[00010] In comparison to the conventional zinc/air cells and the gas generator cells according to the currently existing construction, the new cell has considerable advantages. Thus, the cover of the conventional cell is filled with the zinc powder and the electrolyte, for example, in the form of a zinc gel. The gas electrode is situated in the cup and lies on

the cup bottom which, for the exchange of gas in the environment, has a breathing hole. Because of this (inverse) arrangement, the cover part must be rotated during the mounting of the cell with its liquid content by 180°, which is a measure which is hard to carry out in a clean manner in the case of cells with a fairly large content. The cup part with the gas electrode element which lies flat on it often presents problems during the operation, particularly when, during the closing of the cell, warping has occurred in the edge area of the electrode.

[00011] In contrast, the assembly of the cell according to the invention is almost problem-free, also in the case of large units: The cup, which now operates as the anode part, can be filled with the required quantity of zinc and electrolyte, whatever the form. It remains in this position. The cathode element is placed on it and is then closed off.

[00012] As a result of the optional sheet metal dome with the breathing hole, which arches over the gas cathode, a gas chamber is created which can be closed off by bonding agents (? translator) and is disposed in front of the environment of the cell with which the cell corresponds. In this manner, it can be achieved to keep CO₂ and other harmful gases away from the interior of the cell and to minimize water losses to the environment.

[00013] The collar constructed according to the invention also permits new embodiments of the apparatuses equipped with these cells, which can be held as well as contacted thereby. The preassembled cathode unit with the sealing ring is easy to manufacture and dispose and can then be combined as an equal part with anode cups of varying depths but with a constant diameter, in order to produce cells of a different (gas generating) capacity. In this manner, batteries (particularly zinc/air cells) as well as gas generating cells (particularly hydrogen generating cells) can easily be implemented.

[00014] In the following the invention will be explained in detail with reference to the drawing.

[00015] Figure 1 is a sectional view of a gas generating cell according to the invention;

[00016] Figure 2 is a view of the cover before the assembly of the cathode unit;

[00017] Figure 3 is a view of the anode cup before the assembly.

[00018] The cover 1 illustrated in Figure 2, which is a deep-drawn part made of conductive sheet metal, has a cylindrical section 2 and a bottom 3 closing off this section 2 at one of its ends, around the center point of the bottom 3, a centric hole 4 being constructed which permits the exiting of gas from the gas generating cell. A ring groove 5 is also constructed in the bottom 3.

[00019] During the assembly, a nickel foam (Ni foam) 6 (optional) - which covers the ring groove 5 and the bottom 3 inside the ring groove 6 - and which guides the gas to the hole 4, and a cathode disk 7 adapted to the inside diameter of the cover, and a separate (here not shown separately; for example, a disk-shaped gas diffusion electrode with a separator coating; see German Patent Document DE 35 32 335 C2) are successively placed into the cover 1.

[00020] Then the cylindrical section 2 is shaped (flanged) radially toward the interior, and an insulating or sealing ring 8 made of an insulating material is pressed over the flanged area 14 which, on its interior side, has a groove 15 for receiving the flanged area or collar.

[00021] A preassembled cathode unit 9 is produced in this manner.

[00022] The anode cup 10 is also constructed as a deep-drawn part made of conductive sheet metal and can be filled with an anode material 16, such as zinc gel. It has a cylindrical jacket 11 of a depth T, a ring step 12 being constructed in the cylindrical jacket and having a slightly larger inside diameter than the outside diameter of the preassembled cathode unit, so that the latter can be fitted from above into the anode cup.

[00023] After the fitting-in of the cathode unit, the edge of the anode cup 10, in the area above the ring step 12, is shaped (flanged) toward the interior, so that the cathode unit is framed by the anode cup.

[00024] The preassembled cathode unit can be assembled with anode cups of different depths 10, so that gas generating cells of many different capacities can be easily implemented with a high use of equal parts.

[00025] The cover 1 and the anode cup 10, together with the sealing ring 8, form the metallic housing 13 of the gas generating cell.

[00026] List of Reference Numbers

Cover	1
cylindrical section	2
bottom	3
hole	4
ring groove	5
Ni-foam	6
cathode disk	7
sealing ring	8
cathode unit	9
anode cup	10
jacket	11
ring step	12
housing	13
flanged area	14
groove	15
anode material	16